

THE CHALCIDOID PARASITES OF THE COMMON HOUSE OR TYPHOID FLY (*MUSCA DOMESTICA* LINN.) AND ITS ALLIES.¹

II. RECONSTRUCTION OF THE GENUS *Pachycrepoides* ASHMEAD OF THE
FAMILY PTEROMALIDAE, WITH DESCRIPTION OF *P. Dubius* ASHMEAD,
SP. NOV., ITS TYPE SPECIES.

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Introduction.

This second of the series of papers on the chalcidoid parasites of the house fly and its allies considers a monotypical genus which occurred but rarely in connection with its host. We met with it but four or five times during the course of our rearing work and are not perfectly sure as to its rôle as a parasite. The tribe to which it belongs is composed of genera supposed to be mostly hyperparasitic, but at the present state of our knowledge of the host relations of the group, this is no reason for classing the genus as the same. Our records lead us to believe that it attacks *Musca domestica* as a primary parasite, with the possible alternative of being secondary, its host *Muscidifurax raptor* Girault and Sanders MS.² or one of the species of *Spalangia*, also to be considered later.

History and Description of the Genus.

In a table of the genera of the Sphegigasterine tribe Pachyneurini published in 1904, Ashmead, in his memoir on the classification of the chalcid flies, briefly described the genus under consideration, merely naming the species *Pachycrepoides dubius* Ashmead as type, without describing the species or even indicating that it was new to science. The genus was proposed as follows:

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1. Females	2
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Mesothoracic furrows incomplete, indicated only anteriorly.....	4

¹ Continued from Vol. XVII, p. 28.

² Described in the third paper of this series.

3. Stigmal vein with a large knob; abdomen ovate, pointed at apex, the second segment large, the third segment very short, the fourth and fifth rather large, sub-equal, the following very short.

Pachycrepis Förster (type *Caruna clavata* Walk.)

- Stigmal vein with a small knob; abdomen ovate, the second and third segments large, the fourth and fifth very short, the sixth and seventh longer.

Pachycrepoideus Ashmead, g. nov. (type *P. dubius* Ashm.)

4. Abdomen above flat or depressed.....5
 Abdomen above convexly rounded.....6
 5." Etc., p. 329.

Extracting, the genus was described thus, including both sexes: Pteromalids with the abdomen distinctly petiolate; fore wings with the marginal vein not especially long but thick and stout; cephalic aspect of head short and rounded, the occipital line incomplete; antennæ inserted on or near the middle of the face, far above the clypeus; mesothoracic furrows distinct, complete; stigmal vein with a small knob; abdomen ovate, the second and third segments large, the fourth and fifth very short, the sixth and seventh longer.

It is only through the kindness of Mr. J. C. Crawford of the United States National Museum, who compared our specimens with the single type specimen of the genus, that we were able to establish their identity. The existing codes of nomenclature do not clearly cover this case. As a matter of principle, we are greatly opposed to accepting genera belonging to this class, especially those of recent description, believing them to be obstructions; the species is a *nomen nudum*, for in this case it is obvious that the generic description does not include the species or have reference to any specific characters; it cannot be, therefore, in any sense an indication, definition, or description for the species. Hence, it is our opinion that all genera and species of this class are without status in nomenclature, the many opinions and the codes to the contrary notwithstanding. Accepting this fact, the genus *Pachycrepoideus* and its type species is subject to arbitrary treatment at the hands of the first systematist who happens to deal with it. We have nothing to do here with so-called credit or with courtesy, but solely with expediency and nomenclatorial science, which is impersonal. So we protest, not against this genus alone, but against all of the genera of its class, irrespective of authorship; as we protested

against *Nasonia* Ashmead in the first paper of this series. At the present day, the formation of genera in this manner is both obstructive and inexcusable; it should be prevented.

Recognizing expediency alone in this case, we are of the opinion that both the generic and the specific name should be retained on the basis of reconstruction and that in order to avoid confusion, the



Fig. 1. Antenna of *Pachycrepoideus dubius* Ashm., and right and left mandibles showing dentition.

original author of the names should be cited. We therefore retain the name *Pachycrepoideus dubius* Ashmead with the single female specimen, upon which the genus was founded as type.

GENUS PACHYCREPOIDEUS ASHMEAD.

Type: *P. dubius* Ashmead sp. nov.

Female. Normal in size and aspect for the tribe; submetallic, reticulated. Head (cephalic aspect) circularly triangular, slightly wider than long; clypeus slightly wider than long, its apical margin slightly emarginate at the meson, the whole margin trisinuate; dorsal aspect, head wider than the thorax, the vertex broad and rounded, the occipital margin broadly concave but the vertex not noticeably narrowed at the meson, the ocelli in a flat triangle in the center of the vertex, distant from the margin of the eyes; lateral aspect, genæ rounded, as long as the rounded-ovate eyes, the genal sulcus absent. Antennæ inserted about two thirds down the face, slightly ventrad of an imaginary line drawn between the ventral ends of the eyes, the flagellum clavate; antennæ 13-jointed, with three ring-joints (see fig.) and a 3-jointed club, the pedicel long, distinctly longer than the moderately long first funicle joint (Fig. 1).

Pronotum distinct, transverse, narrower than the mesothorax; parapsidal

furrows distinct, complete; axillæ widely separated, extending mesad to the parapsidal furrows; scutellum normal, rounded; metathorax moderate in length, shorter than the scutellum, declivous, the pro- and mesonotum flat, the metanotum punctate, with complete lateral carinæ, without spiracular sulci and with no true median carina but with a distinct, subacute rotundity at its base medially; its spiracle moderately large, subreniform; no metathoracic neck. Abdomen with a moderate petiole, variable in shape, usually ovate and depressed, concave dorsad, flatly convex ventrad, with a slight ridge along the venter at the meson; rarely compressed and conic-ovate, flat dorsad, very convex ventrad but not long; second and third abdominal segments large, united forming about half the length of the abdomen (excluding petiole), the fourth and fifth segments subequal, much smaller; abdomen about equal in length to the thorax.

Wings normal, hyaline, the short and broad marginal vein subequal to the clavate stigmal vein and a fourth shorter than the narrow post-marginal vein; hind wings uniformly ciliate discally. Knob of stigmal vein small.

Tarsi 5-jointed, all tibial spurs single. Mandibles 3 and 4-dentate (Fig. 2). Maxillary palpi 4-jointed, the distal joint largest, labial palpi 3-jointed, the middle joint smallest, the others subequal.

Male. The same, but the antennæ are cylindrical and inserted nearer to the middle of the face, the genal sulcus present, the abdomen obconic and adpressed and more or less truncate at the caudal end.

The genus cannot be confused with any other of the tribe Pachyneurini, excepting *Pachycrepis* Förster, the complete, distinct mesothoracic furrows distinguishing it. From *Pachycrepis* it differs in the smaller stigmal knob and the abdominal characters brought out in the quoted portion of Ashmead's table given previously.

No locality for the type species has been recorded in the literature, but the single type specimen now in the United States National Museum formerly bore the number 602 of C. F. Baker, Agricultural College, Michigan. We have found it only at Champaign, Illinois.

Our knowledge concerning the host relations of the genus is too scanty for positive statement. As shown on a later page, the single species was reared always in connection with *Musca domestica*, and in four of the six rearing records it was definitely connected with that host of which it appears to be a primary parasite. *Muscidifurax* Girault and Sanders MS. and *Spalangia* Latreille are common primary parasites of the house fly, and in one instance each was

reared in numbers in connection with this species from the same host lot. In several of the host puparia in other lots from which *P. dubius* emerged (single specimens) there was found in each the blackened, compact meconium of the parasite, somewhat similar to that of *Spalangia* and *Muscidifurax*, as well as the remains of a pupa of *Musca*, which fact indicates primary parasitism. The evidence available, therefore, points to *Musca domestica* as the host of this species, which we consider as a solitary, external parasite with habits similar to those of *Muscidifurax* and *Spalangia*.

Pachycrepoides dubius Ashm. sp. nov.

Ashmead, Mem. Carnegie Mus., I, pp. 329, 383 (1904).

Female. Length variable, 1.45–2.10 mm. Normal for the tribe. General color nigroæneous, black with slight æneous reflections, submetallic but in bright sunlight metallic dark-greenish, the abdomen smooth and shining, polished black, like surface of tar, the head and thorax closely reticulated or confluent punctate, reflective, somewhat glossy and sparsely hispid; antennæ concolorous but not metallic, the scape, pedicel and first two ring-joints variable, usually fuscous, the pedicel dusky dorsad; coxæ concolorous, the cephalic and intermediate coxæ more diluted in color, the posterior coxæ metallic; legs variable, uniformly fuscous, with the apical tarsal joint dusky or black, or else fuscous with more or less blackish in the dorsal aspect of the femur or the whole femur distinctly darker than the following joints; tegulæ fuscous; wings hyaline, venation neutral black, the marginal vein conspicuous. Eyes inconspicuous in color, dark garnet, the middle longitudinal third much darker, forming a dark median longitudinal stripe; ocelli liquid pinkish. Venter concolorous. Clothing of body inconspicuous.

(Cephalic aspect) head sub-circular, circularly triangular, slightly wider than long, face with a median impression along the scrobes, the scapes lying side by side in the impression and extending not quite to the cephalic margin of the vertex or to the dorsal apex of the eyes and less near to the cephalic ocellus; clypeus slightly wider than long, slightly emarginate at the meson of its apical (ventral) margin, its basal or proximal (dorsal) margin slightly convex, its sutures obsolete, but the whole sclerite slightly impressed and finely, longitudinally striate; antennæ inserted nearly two thirds down (ventrad) the face, slightly below (ventrad) an imaginary line drawn between the ventral ends of the eyes, but not especially near the clypeus, being slightly more the distance above (dorsad) that sclerite as the latter is long at the median line; (lateral aspect) genal sulcus absent; the cheeks rounded and as long as the length of the eyes; the latter rounded-ovate, longer than wide, with sparse, minute setæ, practically naked, their

surface about equal in roughness to the general sculpture of the head; face declivous ventrad from the insertion of the antennæ; (dorsal aspect) head twice wider than long, wider than the greatest width of the thorax, the vertex broad, its cephalic margin straight and rounded, the occipital margin rounded, concavely curved, the visible portions of the margins of the eyes regularly convex, entire; portions of the head caudad of the eyes narrow but not acute or sharp; lateral ocelli narrow or linear-ovate, the cephalic ocellus circular; each lateral ocellus slightly farther from the respective eye margin than from the cephalic ocellus and a third farther apart from each other than each is from the cephalic ocellus. Occipital foraminal impression rounded.

(Dorsal aspect) pronotum visible, distinct, not as wide as the mesonotum and about a fourth its length, not narrowed at the meson, its margins straight and rounded, obtuse; pro- and mesonotum practically flat, slightly convex (lateral aspect, viewed in outline), the thorax declivous at the mesopostscutellum; parapsidal furrows distinct, complete, narrow, convexly curved; cephalic margin of the mesoscutum straight, its caudal margin broadly convex; axillæ, with their mesal apices or angles, reaching to the base of the respective parapsidal furrow, the suture separating them from the scutellum widening caudad and with a few transverse ridges; scutellum broadly rounded caudad, nearly as long as the mesoscutum, with a faint cross-furrow before apex; mesopostscutellum narrow; metathorax moderate in length, not quite as long as the scutellum, declivous, punctate, bicarinate, without a spiracular sulcus, the spiracle moderately large, subreniform (linear and slightly curved), lying in an oblique position and with its cephalo-mesal end near the lateral carina and not distant from the mesopostscutellum; disk of the metathorax, or portion included between the lateral carinæ, produced farther caudad than the lateral portions of the segment, its lateral angles subacute; neck absent; folds or lateral carinæ distinct, complete, running caudo-mesad in a gently curving line; median carina absent, but at the base of the metathorax at the meson and against the mesopostscutellum is a distinct, subacute rotundity, best seen from the direct lateral aspect. Thorax moderately, confluent punctate, or coarsely reticulated, the sculpture slightly coarser than that of the head, and still more coarse on the disk of the metanotum. Thoracic pleura similarly sculptured, as are also the posterior coxæ; anterior coxæ reticulated, the intermediate coxæ nearly smooth.

Abdomen distinctly petiolate, the petiole moderate in length; the tip of the ovipositor slightly exerted; ventral valves inconspicuous; segments two and three subequal, long, the second longer, both taken together occupying half the surface, the fourth and fifth segments subequal, short, each about a half the length of either the second or third segments; caudal margins of the second and third segments in the dorsal aspect straight, in the lateral aspect curved convexly and in the ventral aspect bilobed, incised at the meson; remaining abdominal segments inconspicuous, the apical segment acute. Wings normal for the tribe, that portion of the fore wing distad

of the submarginal vein closely ciliate, the remaining proximal part mostly naked, the marginal cilia of fore wing short and close, absent proximad on both margins; marginal vein abnormally broadened as in *Pachyneuron* Walker, conspicuous, about thrice the width of the postmarginal vein, short and broad, about the length of the stigmal vein and about a fourth shorter than the slender postmarginal vein; submarginal vein narrow, widening at distal sixth at its curve before joining the marginal vein and more than four times longer than the latter, much slenderer and bearing about fifteen large bristles from its surface; stigmal vein shorter than the postmarginal vein, straight, clavate, and with a small uncus, its knob or club distinct but not formed abruptly; postmarginal vein long and slender, uniform in width, distinctly longer than either the marginal or stigmal veins, being about a fourth longer than either; marginal cilia of the costal margin of the wing beginning at the proximal end of the marginal vein; fore wing broadly rounded at the apex, the wing being widest at a point slightly distad of the end of the postmarginal vein; several spurious veins present. Hind wings uniformly, but not densely, ciliate on the disk, the submarginal vein extending to the hooklets; the costal cell irregular in shape, dilated in the middle, the submarginal vein consisting of a moderately broad proximal half, confluent, or nearly, with the costal margin, then an abrupt narrow portion not as long as the proximal thickened half and curving caudad away from the costal margin, the costal cell distinct and moderately broad at that point, and finally a third, short curved part distad, as broad as the proximal half and curved latero-cephalad to join the marginal vein at the hooklets and uniform in width with the marginal vein; submarginal vein about one and a half times longer than the marginal vein; posterior wings broadest at a point just distad of the apical end of the marginal vein, that is to say, a short distance distad of the proximal half of the wing; apex subacute; marginal cilia longer, sparser, longest on the caudal margin of the distal half or third of the wing. Tarsi 5-jointed, the tibial spurs all single.

Antennæ consisting of a scape, pedicel, three ring-joints, five funicle joints and three club joints; funicle and club hispid-pubescent, the flagellum regularly clavate, the club not abruptly formed or much larger or wider than the funicle. Scape long, cylindrical, slightly tapering distad, more than half the length of the flagellum and longer than the funicle, subequal in length to the united length of the pedicel, three ring-joints and the first three funicle joints; pedicel obconic, conspicuously longer than the third ring-joint and equal in length to it and the first funicle joint combined; the two proximal ring-joints distinct, equal, combined slightly longer than the third ring-joint, the latter abruptly smaller than the first funicle joint, a large ring-joint, nearly twice the size of either of the other ring-joints, and not bare like them, but only a third the length of the following joint and about a fourth the length of the pedicel, wider than long; funicle joints cylindrical, but gradually becoming shorter, so that the

fourth and fifth are subquadrate and subequal, the second and third subequal, longer than wide and the first the longest joint of the funicle, about a third longer than the fourth or fifth; the basal joint of the club subquadrate but slightly longer and wider than the fourth or fifth funicle joints; the intermediate joint wider than long, and the apical joint obtusely conical, slightly larger than the third ring-joint; but a single row of hispid hairs on each joint of the funicle and club, in balsam mounts of antennæ appearing as white longitudinal ridges (Fig. 1).

Mandibles 3- (left) and 4-dentate (right), in the former case, the inner mesal tooth is truncate and shortest, the two others acute, the lateral tooth longest; in the latter case, the three inner (mesal) teeth small, obtuse and subequal, the lateral outer tooth much longer, obtusely conic (Fig. 2).

From fourteen specimens.

Male. Length, variable, averaging 1.60 mm. The same, more æneous metallic, the sculpture coarser, the body more slender, the antennæ pilose-pubescent, inserted nearer to the middle of the face, distinctly above (dorsad) of an imaginary line drawn between the ventral ends of the eyes, but not half way up the eye margins, the face more convex; antennal scrobes deep, margined, running vertically nearly to the cephalic ocellus and nearly confluent at the meson, the medial impression not as noticeable as in the female; genal sulcus present, but very faint, narrow; the abdomen more distinctly petiolate and depressed, obconic, broadly truncate caudad, the second segment longest, covering two thirds of the surface, the abdomen widest at its apex, the third segment about a half shorter and the remaining ones hidden within; genitalia exerted in death; abdomen, including the petiole, not quite as long as the thorax, slightly concave dorsad, slightly convex ventrad; petiole not coarsely rugose.

Antennæ the same in general, but more slender, the flagellum cylindrical; club somewhat narrower than the funicle, the scape slightly curved, not tapering distad, cylindrical, not as long in proportion to the flagellum, less than half its length and not quite as long as the funicle; pedicel large but not as long as the united lengths of the third ring-joint and first funicle joint; the proximal ring-joint smaller than the intermediate one; all funicle joints longer than wide and subequal; the third ring-joint is subquadrate, yet longer than wide and about half the length of any one of the funicle joints and longer than the united lengths of the two proximal ring-joints; first funicle joint not noticeably longer than the fifth; club cylindrical, its first two joints subequal, longer than wide, somewhat shorter than funicle five, the apical joint conical, a fourth shorter than the basal joints. At least three rows of pilose hairs on funicle joints one to five and the three club joints and two rows on the third ring-joint; a few short hairs on the dorsal aspect of the pedicel, the two proximal ring-joints and scape naked.

Mandibles as in the female; the distal joint of the maxillary palpi twice longer than any of the three remaining joints, which are all subequal and

moderately short; the distal joint of the maxillary palpi clavate and hairy at its tips.

Described from eight males and fourteen females, unless otherwise stated, now in the collections of the Illinois State Laboratory of Natural History, Urbana, Illinois, and reared in the insectary of the office of the State Entomologist of Illinois, at Urbana during the late summer of 1908, from the following experiments: (1) One female appeared Sept. 11, 1908, in company with two females of *Nasonia brevicornis* Ashmead from decomposed chicken entrails infested with dipterous maggots, taken from the city dumping grounds, Champaign, August 22, 1908; from these viscera were obtained *Chrysomyia macellaria* (Fabricius), Sept. 7, *Calliphora erythrocephala* (Meigen), Sept. 11, and *Sarcophaga* sp. "K,"¹ Sept. 22. (Accession No. 41003, 1 ♀ tagmounted; ♀ head in xylol-balsam); (2) One female appeared Sept. 3 from a cage containing maggots in decomposed watermelons from the same place, and from which were reared a *Drosophila*, August 30 to Sept. 17, and *Musca domestica*, September 1. (Accession No. 39808, 1 ♀ tagmounted.) (3) On Sept. 10, a number of Pteromalids were collected from the cages in which muscid and other dipterous larvæ were breeding and confined separately in capsules each with a single puparium of *Musca domestica*. One of these Pteromalids proved to be a female of *P. dubius*² which was observed to oviposit into the host puparium on Sept. 10. The resulting progeny proved to be a single female which was found on the fifth of the following October. (Accession No. 40177, 1 ♀ tagmounted, ♀ head in xylol-balsam). (4) Five males and nine females appeared October 24 or previously from a cage containing a quantity of puparia of *Musca domestica* reared from the maggots collected in horse manure, Sept. 20, in a manure box in Urbana, and then left until Sept. 30 exposed in the insectary where they were evidently parasitized. On the latter date, each puparium was isolated in a capsule, and from these capsules were taken the nine females and five males; other pteromalids, *Muscidifurax* and *Spalangia*, were very abundant. (Accession No. 40253, 4 ♂'s, 9 ♀'s tagmounted; ♂ head in xylol-balsam. Remaining ♂,

¹ New species; designated thus for convenience.

² Homotype in U. S. National Museum collection.

homotype in U. S. N. M.) (5) One male appeared on October 2 in company with a number of *Muscidifurax* from a large lot of puparia of *Musca domestica* reared from maggots in horse manure and exposed to parasites for three days, Sept. 8–11. On Sept. 17, the host puparia were isolated in gelatine capsules and from one of these puparia the male emerged. The puparium contained the host pupa in fragments and the single, large meconium of the parasite. (Accession No. 40171, 1♂ tagmounted). (6) Nine days later, October 11, from each of these isolated puparia of the same lot (*Musca domestica*) there emerged two males and one female. Both *Spalangia* and *Muscidifurax* were very common in this experiment. (Accession No. 40206, 2♂'s, 1♀ on tags).

The characteristics of this species are the blackish æneous color, the generally uniformly fuscous legs, the concolorous coxæ, the generally fuscous scape, pedicel, and basal ring-joints, the remainder of the antennæ being neutral in color or nearly concolorous with the body, the polished abdomen and uniform sculpture of the thorax, the position and shape of the ocelli and the hyaline wings.

Among the thousands of Chalcidoid, mostly pteromalid, parasites reared from muscid and other Dipterous larvæ during the course of breeding experiments with the house fly during the latter part of the season of 1908 this species occurred very rarely as recorded in the foregoing.

Type:—Type No. 12260, United States National Museum, Washington, D. C., 1 ♀, tagmounted (C. F. Baker). *Homotypes*:—1♂, 1♀ in the same collection, Urbana, Illinois, both tagmounted.

Nothing is known concerning the biology of this genus. The adults emerge (three cases) from the host puparium through a single circular hole with jagged edges but so far we know of no characteristic distinguishing these emergence holes from those of *Spalangia* or *Muscidifurax*. The meconium is a single dark compact mass circular in outline, but is not very characteristic and beggars description.